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SCIENCE NEWS-LETTER

The Weekly Summary of Current Science

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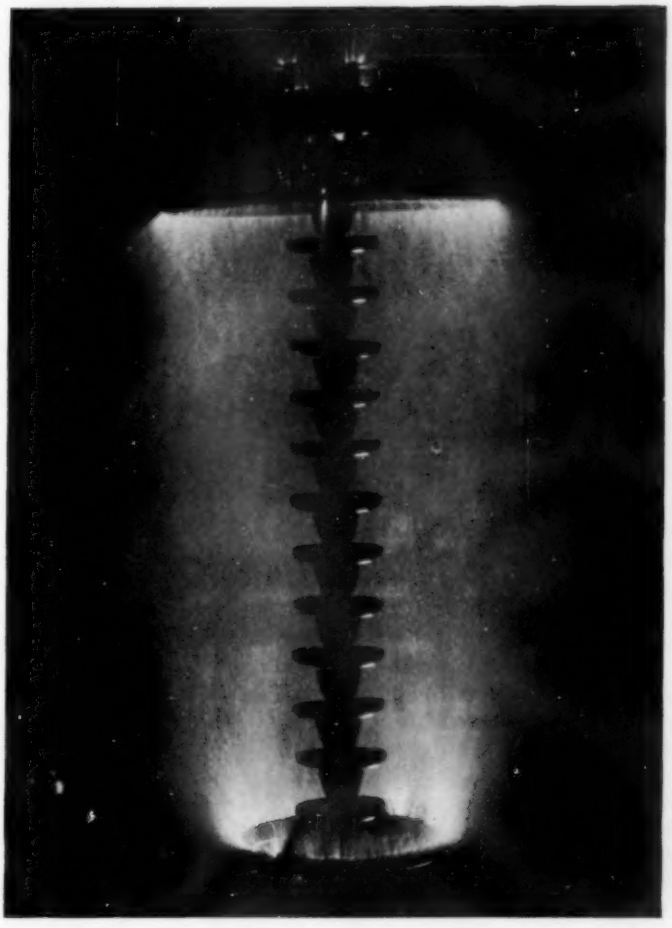

LIFE-SAVING CORONA

"Barreled" Around an Insulator to Protect It

(*See page* 123)

Vol. XVII *No. 463*

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New Language Needed for Electricity

Physics—Electricity

Engineer Predicts Surpassing Einstein's "Ultimate"

TELLING "what electricity is not," and claiming that a new language is needed to tell what electricity is, Prof. Vladimir Karapetoff, one of America's foremost electrical engineers, predicted the further division of the electron and the finding of a wave motion with a velocity greater than that of light. He addressed the New York Electrical Society and the local section of the American Institute of Electrical Engineers.

Recent experiments are disturbing the apparently "ultimate" velocity of 186,000 miles per second of Einstein, declared the Cornell University professor and consulting engineer. According to theories of the proponent of relativity, material particles cannot move at a velocity greater than that of light, which travels at the rate of approximately 186,000 miles a second.

But Prof. Karapetoff said that some recently observed phenomena make it necessary to assume that electrons and positive carriers of electricity partake both of the nature of matter and of waves, and that the phase of these waves is propagated at a velocity greater than that of light.

"The comforting statement that these waves are not material, and therefore not hindered by material things in their enormous velocities," Prof. Karapetoff explained, "only brings us to the deeply philosophical problem of how these immaterial waves can manifest themselves by affecting the behavior of material particles."

Destruction of the popular conception of matter is found in Prof. Karapetoff's assertion that in all probability the infinitesimal and theoretical electron, hundreds of millions of which would not fill a space the size of an ordinary pin head, is still further divisible.

"We have been accustomed to call the electron the smallest particle of all matter and to say it was indivisible," he explained, "as we did with the atom until that was divided into electrons. Yet we endow the electron with physical properties . . . . such as radius, mass, axis of spin, electric and magnetic fields, accompanying waves, etc.; and as soon as we do this, allowing it some structure, this structure must be divisible, and those parts must have their structure, ad infinitum.

"So the explanation of the electron shifts the difficulty one step further along an infinite ladder, and seems to accentuate the inevitable necessity for a so far inconceivable mode of expression." This future language, it was pointed out, must transcend present limited modes of expression—mathematics, speech or pictures — by means of which scientists are attempting in vain to present a concept of physical forces mechanically or by analogy.

"Only some super-human being could speak this unknown language at present," said Prof. Karapetoff; "and were he able to attempt an explanation of electricity we could not understand him.

"Electricity is analogous to nothing else in the world that we know anything about," he went on. "According to our present idea, it is really comprised of three apparent independent entities—negatively charged particles, or electrons; positively charged particles such as alpha rays, protons, clusters, etc.; and various types of electro-magnetic radiations, as gamma rays, X-rays, and cosmic rays.

"From some recent experiments we have been led to the belief that under certain conditions the particles behave somewhat like electro-magnetic pulses; and conversely, there is some evidence to indicate that electro-magnetic radiations may display properties of the discrete particles.

"In other words, all three manifestations of electricity seem to be endowed simultaneously with inertia and charge, to be found in material objects, and with some wave properties such as frequency and wave length, as ascribed to ethereal or non-material oscillations. So electricity becomes neither flesh, fowl, nor good red herring, but something entirely apart. It is for this reason that a new terminology is needed."

Calling attention to the fact that during the last 2,000 years man has become more and more proficient in pointing out what matter is not and what the mind cannot comprehend, Prof. Karapetoff said that the knowledge of what electricity is not, overwhelmingly exceeds any inkling man may have of what it is.

During a ten minute intermission, the scientist, who is also a talented musician, gave a brief piano recital.

Science News-Letter, February 22, 1930

The Answer Is

In This Issue

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Theory Proposed on Cause of Cancer

Medicine

Dr. Leo Loeb Reviews Present Knowledge of Disease

A TENTATIVE, working theory of the cause of cancer was advanced at the meeting of the American College of Physicians by Dr. Leo Loeb of the Washington University School of Medicine. Dr. Loeb reviewed the present knowledge of cancer, which consists of a number of disconnected facts brought out by various investigators, and proposed his theory which attempts to construct from these facts a connected whole.

If the action of heredity is considered as sensitizing the substratum to the effect of various agencies which promote growth, it may be concluded that all the factors which cause cancer have in common the faculty of increasing the reproductive, growth-producing activity of cells, usually over a long period of time. It is this continued excess in reproductive activity in localized and often in sensitized cells which leads in the end to the cancerous changes, according to the theory suggested by Dr. Loeb.

"Thus we might tentatively attempt to construct out of more or less isolated facts a connected whole, a provisional theory," Dr. Loeb said. "This theory presumably will have to undergo many changes, but it will have served its purpose if it makes it easier for us for the time being to keep in mind and to understand many otherwise disconnected findings."

Sun Treatment

HELIOTHERAPY, or treatment with the direct rays of the sun, in cases of tuberculosis of the lungs seems to be limited as to favorable results, Dr. Bernard L. Wyatt, of Tucson, Ariz., reported

"It is clear that the series is too small for definite conclusions to be arrived at," Dr. Wyatt said after reporting his results with heliotherapy in some 200 cases of pulmonary tuberculosis, "but it is a matter of considerable interest that the number of patients showing appreciable improvement that might be attributed solely to direct heliotherapy was negligible."

Dr. Wyatt was careful to point out that because his studies were made under meteorologic conditions prevailing in southern Arizona, no generalizations would be drawn from them. Dr. Wyatt's experience with direct rays from the sun in treating other forms of tuberculosis was more gratifying, he reported. His observations on the limitations of this form of treatment in tuberculosis of the lungs was confirmed by the opinions of other authorities, he said.

"Sunlight, which was formerly used extensively in Switzerland for the treatment of pulmonary tuberculosis, has been given up almost completely," he said, and also quoted a personal communication from Dr. Edgar Mayer of Saranac Lake, N. Y., who wrote: "As to the use of direct sunlight in pulmonary tuberculosis, I think that most of the reports have not been on controlled cases and therefore biased in its favor. We have given it a very fair trial here in the summer time and only in the rarest instances was I convinced that it helped."

Is this good for tuberculosis?

Personality

SUSCEPTIBILITY to certain diseases goes hand in hand with certain types of personality, Dr. Walter Freeman of St. Elizabeth's Hospital, Washington, D. C., told the meeting.

This fact, learned from 1400 postmortem examinations made at the government hospital for mental diseases, should help physicians treating patients who are not confined to such institutions, because personality types are the same inside and outside of these institutions. They are more exaggerated in patients inside the institutions, but Dr. Freeman told the assembled physicians methods and questions by which they might easily determine to which type their patients belonged.

Persons of the quiet, retiring personality type, who are given to daydreaming and who are happiest living a routine existence, are especially apt to have tuberculosis, Dr. Freeman found. He called this type schizoid. Cancer was found most often and tuberculosis least often in the paranoid type; this is the type that is moody, grouchy, quarrelsome and suspicious. The cycloid type, who is the "good fellow," with hosts of friends and innumerable activities and interests, appears to be most susceptible to diseases of the heart, kidneys and blood vessels. The fourth type, the epileptoid, characterized by convulsions or sudden fits of temper or migraine, is most apt to have diseases in which the structures of the brain and glands of internal secretion are affected. Cancer, on the other hand, is a rarity in such individuals.

Dr. Freeman explained the relation between personality types and susceptibility to disease by the theory that a personality which will respond in a certain way to a psychological insult will respond similarly to a bacterial or chemical insult. The psychological insult may send the patient to a hospital for mental diseases, while the chemical or bacterial insult may send him to another hospital for the treatment of tuberculosis or heart disease.

"Stomach Trouble"

IN 500 consecutive cases of indigestion or abdominal distress reviewed by Dr. Walter C. Alvarez of the Mayo Clinic, Rochester, Minn., he found that "The most frequent single cause of 'stomach trouble' was disease of the gallbladder."

"Actual disease of the stomach could be demonstrated in only 12 of the 500 cases," Dr. Alvarez stated. "As Dr. W. J. Mayo long ago pointed out, the stomach often serves as a firebox to call attention to a conflagration elsewhere in the body. In many of these patients the fire was far away, in the brain, the teeth, the thyroid, lung, heart, spine, (*Turn to page* 124)

Thyroid Sets the Pace

Endocrinology

By Jane Stafford

Dr. Oscar Riddle, of the Carnegie Institution of Washington, who has made a recent contribution to our knowledge of how the thyroid gland functions.

YOUR thyroid gland governs the speed at which you live. Whether you are fast or slow, tall or short, fat or thin, or comfortably in between, is determined by the small U-shaped gland located in the front of the neck. This gland sets the pace for all the other organs in the body, including the nerves and the brains. The gland does this through a very powerful substance which it secretes, called a hormone.

That the thyroid regulates the tempo of the body processes has only now been definitely established, though the problem of the thyroid has puzzled scientists for many years. This gland exerts its influence on all parts of the body, and slows or speeds their development and functions.

"Research has slowly enlarged the circle which circumscribes those physiological processes recognized to be under the regulation of the thyroid gland and today it can be clearly stated that the gland determines the pace which is to be maintained by all of the other organs and systems of organs of the body," stated Dr. Edward C. Kendall of the Mayo Foundation in his recently published book on thyroxin, the active principle of the thyroid gland, which he was the first to isolate.

Back in 1874 Sir William Gull took the first step in solving the problem of how the thyroid functions. Another step has just been taken by Dr. Oscar Riddle of the Carnegie Institution. In a paper read before the Association for the Study of Internal Secretions, Dr. Riddle presented evidence of the relation of the thyroid to the process of reproduction. Working with pigeons, he and his associate, Dr. J. Krizenecky, found that the structure of the thyroid undergoes characteristic changes with each ovulation cycle. The formation of the egg is only a part of the entire process of reproduction, and the thyroid undoubtedly bears a close relation to the rest of the process, in pigeons and other animals, including man. So far the studies have been limited to ovulation. But it is known that during the spring and summer, the periods of active reproduction, the thyroid is at its lowest ebb as to weight and function. In winter, when the thyroid is largest and most functional, reproduction is entirely suppressed in the pigeons.

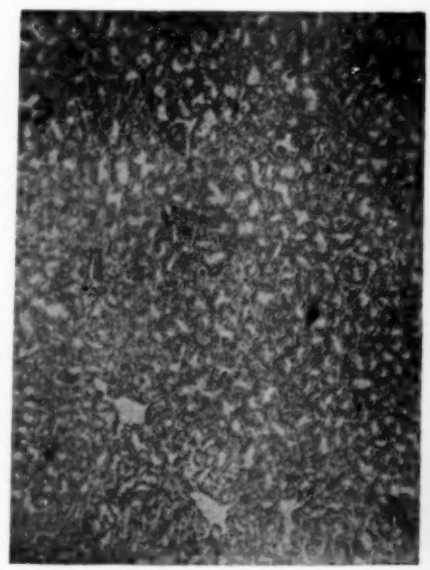
"When thyroid weight is low, or rather while it is undergoing a definite decline in weight and function, the period of riotous reproduction occurs in these animals," declared Dr. Riddle, referring to the doves and pigeons which he and his associates observed.

In between Gull's original observations and Dr. Riddle's most recent investigations lies a period in which important facts concerning the thyroid and its activity and diseases were learned. Thyroxin, the active principle of the substance which the gland secretes, has been isolated, its exact nature determined and it has been produced synthetically in the chemist's laboratory. This has made it possible to treat successfully persons suffering from a certain form of thyroid disease.

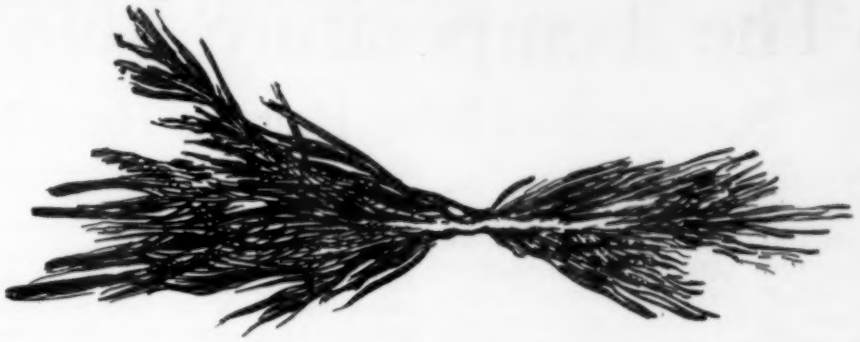
Normally the gland regulates the various organs so that they function at the most efficient rate for carrying on the body's activities. In disease, the thyroid may speed up the organs so that the body becomes worn out from the rapid pace. The heart beats faster, the nerves are highly agitated, food is swiftly converted into energy and burned up, and the reserve fat of the body is all used up in supplying additional energy. The whole picture is that of an engine that has been raced until every part is worn out.

In another kind of thyroid disease, the gland secretes so little of its hormone that the pace is much too slow for efficient or comfortable living. The body moves slowly and fat accumulates rapidly. The nerves and circulation are sluggish. The mental development is greatly retarded. The long bones do not grow as they should. The fat lady of the circus is an example of this type of thyroid disease.

Stored in the thyroid is the body's supply of iodine. This is elaborated into a hormone, of which the active principle is the powerful thyroxin, as it is now known. Through the blood stream the thyroxin reaches every part of the body with its



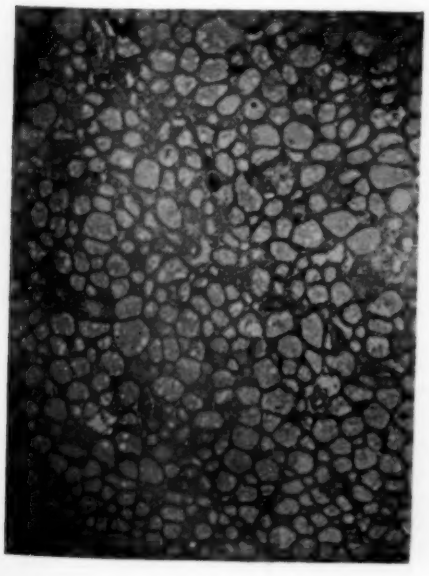
Structure of thyroid in the pigeon at the time of ovulation. A characteristic structural change takes place at each ovulation cycle.



These needle-like crystals are the powerful thyroxin, the active principle of the thyroid hormone which controls the speed of body processes (Kendall).

charge of iodine, so necessary to the well-being of animals. The mechanism by which this chemical affects the body organs is not clearly understood even yet. Only the results of its action or failure to act are known definitely. Dr. W. Cramer, formerly of Edinburgh University, thinks it acts on the sympathetic nervous system and thus affects the entire body.

When the gland, either through removal, disease or failure to develop properly, does not secrete enough hormone, the body processes slow up. The result is known as myxedema. Persons thus affected are short, very fat, slow of action and of comprehension. The tongue is thickened and speech is slow and hard to understand. If persons so affected are treated with extract of thyroid gland or with thyroxin, they may be restored to a normal condition. Children who are born with too little thyroid or with underactive glands are known as cretins. Mentally they never develop and they have all the other symptoms of advanced myxedema. If they are treated with thyroid extract or its hormone, they also recover, particularly if treatment is started before they reach the age of ten. In both cretinism and myxedema, the treatment must be continued always, as it is supplementary but not curative. That is, thyroxin or thyroid extract supplements the very small amount of hormone being secreted by the patient's own gland, but it does not restore the gland to a normal condition.



Thyroid of pigeon during "resting" period, more than 108 hours removed from ovulation.

When the thyroid gland becomes overactive, it secretes an excess of its powerful hormone. This brings about too rapid a rate of function on the part of the other organs. Sometimes the gland itself is enlarged, producing the familiar goiter. In one type of hyperthyroidism, as this excessive activity is called, the eyes of the sick person also bulge. The skin sweats profusely, the heart works faster, movements are quick and there is a complete lack of repose, even to the extent of sleeplessness. People suffering from excessive thyroid activity lose weight rapidly, and although they may eat much more than usual, still the food is used up supplying the extra energy needed by the body in keeping the terrific pace set by the overactive thyroid. Removal of part of the gland brings back a normal condition. The small part of the gland that is left cannot secrete enough thyroxin even at the previous rate of the accelerated activity, to disturb the normal tempo of the body.

With this control of the body's speed, the thyroid also plays an important part in controlling the temperature of the body. Under-activity of the thyroid lowers the temperature of the body and those suffering from myxedema, in spite of their heavy layers of fat, are not able to keep warm at the temperatures normal people find comfortable. On the other hand, hyperthyroidism, or overactivity, may bring about a feverish state. The actual elevation of temperature may not be great in degrees, but sweating is free, and the patients suffering from this condition present a picture of feverish activity and warmth. Studies recently made by Dr. Cramer have indicated that the temperature-regulating power of the thyroid is affected by climate.

What we know as a "bracing climate," one in which temperature changes are frequent but high temperatures are rare, stimulates the thyroid gland to increased activity, but usually not to a dangerous degree. A cold breeze in midsummer or the fresh, crisp days of autumn make us feel full of energy and well-being. That is because the temperature change has stimulated the thyroid and more thyroxin makes its way to nerves and organs, accelerating their pace. Similarly high temperatures, such as fever, stimulate the thyroid. But in warm, even climates, thyroid activity does not vary. The greatest initiative, energy and creative ability of people living in temperate regions over those living in the tropics is due to frequent stimulation of the thyroid by the frequent weather changes, Dr. Cramer thinks. It is generally conceded that man would never have progressed to his present state if he had not left the tropical land of his origin.

The thyroid may even have been responsible for the evolution from amphibians of many and all vertebrate animals living on land. This possibility, advanced by Dr. E. Uhlenhuth of the University of Maryland Medical School, is seen from the fact that thyroid activity can cause an entirely new set of organs and tissues to develop in certain amphibians or water animals, such as salamanders. May not, Dr. Uhlenhuth asks, this power have once been exerted in such a way as to develop the organs and tissues which men and other animals have but which are lacking in fish, another class of vetebrates? It is the thyroid which causes the metamorphosis in salamanders. Increased thyroid activity increases the speed of this process but salamanders suffering from too little thyroid activity fail to metamorphose completely. When the thyroid gland is (*Turn to page* 123)

The Temperature Man Best Enjoys

Engineering

Scientists Find What Heat and Humidity Make People Do

When mining engineers get together as they did at the annual meeting of the American Institute of Mining and Metallurgical Engineers, new and interesting facts are made public. In some of the 175 papers delivered at the scientific sessions, these achievements were recorded.

PEOPLE work best when the thermometer registers between 40 and 75 degrees Fahrenheit. A temperature greater than 90 degrees in moist, still atmosphere would soon become unbearable. A pulse rate of 160 beats per minute indicates that the limit of endurance of atmospheric conditions has been reached.

These facts are revealed by experiments conducted at the U. S. Bureau of Mines in Pittsburgh to find the conditions of temperature, humidity and ventilation at which man can live and work best. They were described by Dr. W. J. McConnell, of the Metropolitan Life Insurance Company's Industrial Health Service, before the recent meeting of the American Institute of Mining and Metallurgical Engineers held in New York City.

Although conducted primarily to find means of increasing the comfort and efficiency of mine workers, the experiments will have many other practical applications, Dr. McConnell said. "They enable the engineer to predict how human beings will respond to certain temperature conditions and to suggest the most efficient system of combating exigencies of environment," he declared.

The possibility of controlling atmospheric conditions to treat such pathological disorders as nephritis, rheumatic infections, other forms of arthritis, certain skin troubles, superficial infections, and a variety of respiratory infections was also told.

"According to these researches," said Dr. McConnell, "the maximum amount of work was performed by those tested between the effective temperature limits of 40 and 75 degrees Fahrenheit. Subjects of experiments were capable of performing four times more work in a temperature of 100 degrees with a relative humidity of 30 per cent. than in a saturated condition of 100 degrees. For ordinary humidity of 60 per cent., the subjects did about five times more work in a temperature of 90 degrees than in one of 120 degrees."

An upper limit of man's ability to compensate for atmospheric conditions has also been established. When at rest or in still air, it was explained, this upper limit lies around 90 degrees saturated, or an effective temperature of 90 degrees.

But if an air velocity of two and a quarter miles per hour is introduced, the other conditions remaining the same, the upper limit is raised to 95 degrees. With increased air velocity, a still further shift results.

When ordinary muscular work was done, measured as 90,000 foot-pounds per hour, this limit was reached at 80 degrees.

"The observations further indicate that the pulse rate rather than the rise in bodily temperature determines the extent of discomfort experienced," he declared. "When the pulse rate exceeded 135 pulsations per minute, the subjects complained of discomfort. They became restless and irritable and acquired a headache and palpitation of the heart. They became very thirsty; they noticed a metallic taste and spoke only with effort.

"The conditions became distressing and unbearable after the pulse rate exceeded 160 beats per minute. Dizziness and confusion resulted, followed frequently by nausea, and numbness or soreness of the face. As the severity increased a feeling of 'floating in the air' was experienced, and it is probable that heartstroke would supervene if the exposure were continued. When the subject left the test chamber, . . . the pulse rate began to drop rapidly and his condition immediately improved."

The tests were conducted in compartments insulated by cork board. Fans, heaters, humidifiers, refrigeration equipment, distributing system and automatic control could hold any dry bulb temperature from 20 to 180 degrees, humidity from 10 to 100 per cent. and velocity from still air to 1,000 feet per minute.

THE only active mine in South America producing emeralds, the world's most precious stone, is using today the crude methods of the Spanish Conquistadores as it did 400 years ago and is finding the ancient way of working entirely satisfactory and as efficient as modern machinery would be in the part of Colombia where the mine is located.

The revival of work in this mine, reputed to have yielded the Spanish crown an emerald so large that it was cut into a small cup, and the success an American company is now having there was described by P. W. Rainier of Guateque, Colombia, before the mining and metallurgical engineers.

Guateque is the nearest post office to the Chivor-Somondoco emerald mine. It is ten hours distant by horseback on bridle paths through dense forests. The average elevation at the mine, which is on the eastern slope of the Andes mountains, is 8,000 feet, and the land is so rugged that differences of elevation as great as 4,000 feet are often found within an area one and a half miles square.

Into this sparsely settled region so rugged and inaccessible, the cost of bringing modern machinery is prohibitive. With machinery skilled operatives would have to be imported, because the native Chibchas, dependable under firm control, do not have the capacity for learning to operate machinery.

But they can carry out well the simple mining operations of their ancestors, which are usually effective there because of the character of the land. "The forest growth on an area to be exploited is first cut down and burned," explained Mr. Rainier. "A trench is then dug to crosscut any veins that may lie below the surface, the loosened dirt being washed away by a head of water released from a tank above. . . .

"Occasional hard ledges of rock are hand-drilled and blasted. Apart from the drilling, the only tools used are crowbars and hoes. A recent crosscut section executed in this manner was 400 feet long, 120 feet deep, and involved the removal of approximately 200,000 cubic yards of material. . . .

"The emeralds are picked by hand

from the vein, graded, cleaned with acid and prepared for shipment."

Under penalty of law every person who killed a chicken in a certain section of Colombia, South America, had to submit the fowl to a government official for inspection. This was a recent, rigidly enforced statute, according to the report of C. Kendrick MacFadden, mining engineer of New York.

The jurisdiction of the law covered territory near the Muzo emerald mine during its recent operation by the Colombian government, explained Mr. MacFadden. The government did not want to lose any emeralds, and chickens much prefer them to ordinary gravel.

31 Miles Down

EXPLORATION of the interior of the earth 31 miles below its surface in Brittany, France, by measurement of an artificial electrical current passing through the ground was reported by Conrad and Marcel Schlumberger, of Paris.

While it is yet impossible to predict the formations at such a depth, the work of the Frenchmen is the first step in applying to such great depths a method which has proved itself of immense value to geologists in helping them locate valuable mineral deposits near the earth's surface.

The actual application of the electro-magnetic method to depths of 1,500 feet was reported by Theodor Zuschlag, consulting engineer, of New York City. Mr. Zuschlag described the Sundbery method which makes use of the magnetic field set up by a current passing through an insulated wire laid as a large rectangle on the ground.

In France the electrical potential method was used. A current of about two amperes was passed through the ground for a distance of 124 miles and careful readings of voltage and current taken. The current was limited by the different resistances of the underground formations.

Helium

ACCIDENTAL finding of a source of natural gas in southeastern Colorado said to contain seven per cent. of helium, the richest helium discovery ever made, was reported by F. F. Hintze, of the University of Utah.

Helium is usually found in natural gas only to the extent of one or two per cent.

"An open flow of 3,000,000 cubic feet per day was the estimated volume of the gas flow, and the helium content is said to be 210,000 cubic feet per day," elaborated Mr. Hintze. This does not mean that the well would yield 3,000,000 cubic feet of gas and 210,000 cubic feet of helium per day continuously. Its daily production would doubtless be less than a quarter of its open flow.

This discovery helps to clinch the hold of the United States on the world monopoly of the non-inflammable lifting gas for airships. The present price of helium is about $20 the thousand cubic feet, much higher than that of hydrogen, its inflammable competitor.

The discovery was made during oil drilling operations just south of Thatcher. The gas comes from a depth of about 900 feet.

The American Helium Company has located a small refining plant at Thatcher. The only other plants in the world for extracting helium from natural gas are at Dexter, Kansas, and Amarillo, Texas. The one at Dexter is another small plant of the private company while the large refinery the U. S. government established during the World War is located at Amarillo.

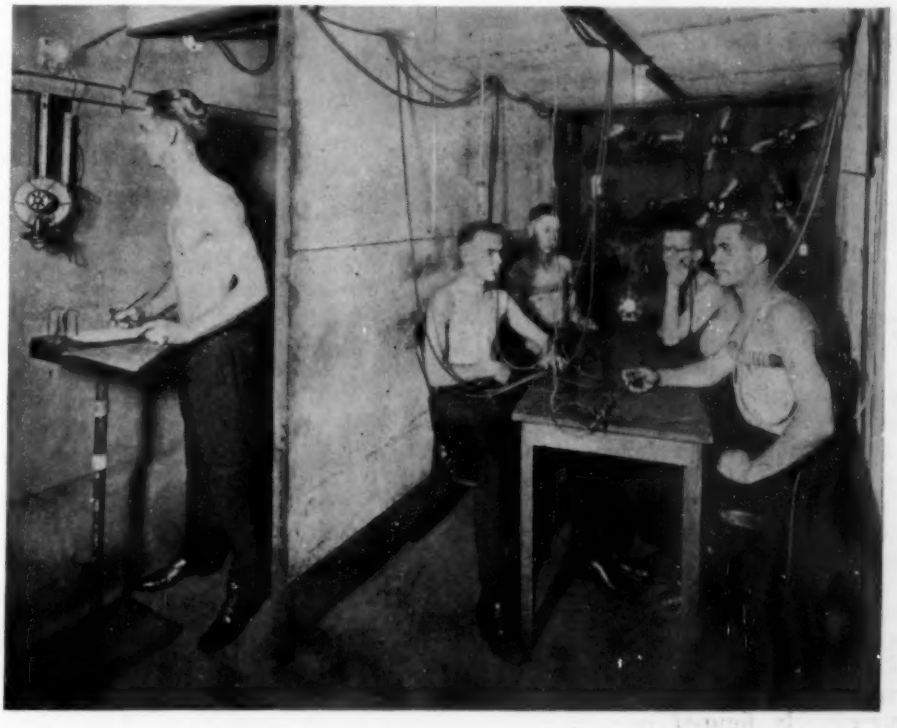
While the United States enjoys her monopoly, foreign nations are diligently searching for other sources of the valuable gas; and the British report success.

Monazite sand, source of thoria from which gas mantles are made, may provide the lifting power for future British airships. Work at the Chemical Research Laboratory at Teddington by R. Taylor has shown that this sand is a possible source of helium. Large quantities of monazite sand are available in the British Empire, especially Ceylon and Travancore, India.

The monazite sand yields about one cubic centimeter of helium to every gram of sand. This means that to fill a ship of 5,000,000 cubic feet capacity, the size of the R-100, newest of British dirigibles, 150,000 tons of sand would be needed.

The gas escapes from the sand on heating, so in treating it for the manufacture of thoria large quantities of helium are wasted. In the process for its refinement worked out by Mr. Taylor, the gas is treated with heated magnesium metal which removes most of the nitrogen, and then final treatment with heated calcium removes the rest of the nitrogen and other gaseous impurities.

Science News-Letter, February 22, 1930



The test chamber, showing different kinds of scientific apparatus recording the behavior of human subjects under varying atmospheric conditions. Wet and dry bulb thermometers, respiration indicators, room thermometers, body thermocouples and fans for producing a constant artificial wind are prominent.

Goldenrod Rubber

Thomas Edison has taken steps to protect his scheme for getting rubber out of goldenrod and other small plants by taking out a patent on the process. His new patent just issued, bears the serial number 1,740,079.

The difficulty about getting rubber out of such plants as goldenrod lies in the fact that most of it lies in the pith and in the cortex, or bark-like outer portion of the stem, while the bulky woody inner parts contain little or no rubber, yet clog up the extracting machinery and involve a lot of expensive handling of worthless material. Mr. Edison's process aims to get rid of this part of the stem.

In the process as described in the patent, the dried plants are first crushed between rollers, to open up the pith seams and break the bark. The crushed plants are then cut into pieces one-half inch long and soaked in water.

After this they are put into a water-filled ball mill. A ball mill is a device somewhat like a concrete mixer, which tumbles its contents over and over with a number of hard steel balls. This rapid pounding breaks the bark into small fragments, but shreds the woody part into fibers.

After about an hour in the ball mill the contents are screened, separating the bark fragments from the fibrous inner portions of the stem. This mass can be used in paper making of similar manufactures.

The second stage of the process consists in grinding the separated bark and pith pulp in water and permitting the solid matter to settle in a tank. The rubber particles, being lighter than water, rise to the surface and are floated off.

Mr. Edison claims that this process is commercially practicable for producing rubber from goldenrod and other small herbs and shrubs.

Chemistry
Science News-Letter, February 22, 1930

Thousand Island Park

Twenty-eight of the famous Thirty Thousand Islands of the Georgian Bay region, which for many years have offered such an interesting vacationland to citizens of both the United States and Canada, have recently been set aside by the Dominion Government as a national park.

Beausoleil Island is one of the most interesting of those acquired for park purposes. It has an area of 2,712 acres, and in addition to its great scenic beauty is of historic interest. It figured prominently in the triple battle of St. Louis, which was fought in March, 1649, on the ridge just above the site of the present town of Port McNichol, and Indian refugees from this battle settled there afterwards. Almost two centuries later, on June 5, 1856, the island was surrendered by the Indians to the Crown and was under the jurisdiction of the Canadian Department of Indian Affairs until included in the new park.

National Parks
Science News-Letter, February 22, 1930

Large Garages Safe

Little danger of carbon monoxide poisoning was found in multi-story garages in experiments conducted by W. C. Randall and L. W. Leonhard, Detroit engineers. The greatest concentration of the gas found in large garages during many tests is only sufficient to cause attendants to have headaches.

A fast running motor exhausts between one and one and a half cubic feet of carbon monoxide every minute. The concentration in multi-story garages, however, was found never to exceed one and a half parts in 10,000, and this only during rush hours.

Even in cold weather, when ventilation is limited, this type of garage is large enough to hold the excess gas without dangerous concentration, and the movement of cars keeps it stirred up and prevents pocketing, the two engineers reported.

Physiology
Science News-Letter, February 22, 1930

Smallest Park Passes

THE smallest member of the U. S. National Park system, Sully's Hill Park in North Dakota, is to have its formal status changed to that of a national game preserve, by a bill introduced in the House by Representative Thomas Hull. The change will be, in effect, simply an official recognition of *de facto* conditions, because the area in question has never been used as a national park and has long been the site of an important game preserve. By transferring it from the Department of the Interior to the Department of Agriculture it is felt that the use for which it is best adapted can be better promoted.

Sully's Hill National Park was created by an act of Congress in 1904. It contains one and one-fifth square miles, fronting on Devil's Lake. Mr. Hull's bill provides for the enlargement of the game preserve by the acquisition of not more

IN VARIOUS CIE

than 3,000 acres to the east and south of the present area.

Other "pocket-size" parks are Platt National Park in Oklahoma, one and one-third square miles, and Hot Springs National Park in Arkansas, one and one-half square miles. Both of these areas contain many hot springs, and the latter park, which was set aside as a military reservation almost a century ago, has become the center of one of the most famous health resort cities in the world.

Public Parks
Science News-Letter, February 22, 1930

Sun Spots

Weather prediction in the future must take into consideration variations in solar radiation, especially those eruptions noted in connection with sun spots, according to William I .Rooney, associate physicist of the Department of Terrestrial Magnetism, Carnegie Institution. Mr. Rooney has just returned on the Grace liner Santa Barbara from the Carnegie Observatory at Huancayo, Peru, 12,000 feet above sea level.

Observations made by him during his two months there are part of a series he is making throughout the world of the resistance of earth materials in order to check measurements of currents flowing through the earth.

"While there is still considerable skepticism among scientists as to the connection between weather and sun spots," Mr. Rooney declared, "I believe that all those who have made a careful study of the available data are now agreed that there is a direct connection."

Mr. Rooney said that his work upon the resistance of earth materials had shown that certain solid substances, such as clay impregnated with magnesium salts, were better conductors of earth currents than sea water, formerly considered one of the best conductors. The resistance of earth materials may vary from 100 ohms to 5,000,000 ohms per cubic centimeter within the same square mile, he said.

This has an important bearing upon geophysical prospecting, he explained, for the variation in conductivity of earth materials enables the physicist to determine the depth of strata without boring or excavation by setting up electrodes in the earth's surface and measuring the resistance between

CIENCE FIELDS

them. He said he had determined the depth of surface water to within six inches by this method.

Measurements of the potential gradient of the atmosphere, he said, might vary during the day from 100 volts per meter positive to 50 volts per meter negative electricity. Although the potential is high, he explained, there is very little current flowing so that it is difficult to measure. There is a continual radiation of electricity from the earth taking place, he said, but most of it is not lost. One of the most usual theories for its return is that it flows back in large quantities during thunder storms and in connection with ordinary precipitation.

Astronomy—Meteorology
Science News-Letter, February 22, 1930

Faraday Medal

Sir Ernest Rutherford, the physicist who made alpha rays from radium knock hydrogen out of various light chemical elements, thus accomplishing transmutation, and who has been president of the Royal Society, Great Britain's leading scientific society, since 1925, has been awarded the Faraday medal by the British Institution of Electrical Engineers.

Sir Ernest is a foremost British scientist and has many accomplishments to his credit in different fields. In 1908 he was awarded the Nobel Prize for chemistry. The Faraday medal is given for notable scientific or industrial achievement in electrical engineering or for conspicuous service rendered to the advancement of electrical science, irrespective of the recipient's nationality.

Physics
Science News-Letter, February 22, 1930

Like Flag Colors

The colors of the American flag are the most beautiful in the rainbow in the estimation of Filipino school children. At least, this is true among hundreds of young Filipinos who have advanced in school beyond the third grade and who have begun to absorb ideals of patriotism.

The views of more than 1,000 Filipino children as to the order of their color preferences have been obtained by two psychologists, Dr. Thomas R. Garth and Isidoro R. Collado, of the University of Denver. Reporting their experiment in the *Journal of Comparative Psychology*, they say that Filipino children are like Indian children in voting red the most beautiful of all colors. In a previous experiment with white children, blue won first esteem.

The gay colors of violet, red, and orange fought for high rank in the personal preference of little Filipinos of the first three grades. Blue was not to be compared with these colors for beauty, their choices indicated. White trailed at the end of the list, with yellow just above it. But from the fourth grade on up to high school, the young Filipinos set red, white and blue as the three choicest colors, in varying orders, the psychologist found.

Psychology
Science News-Letter, February 22, 1930

Two 1000-Foot Spans

The War Department has announced approval of plans for the construction of a highway bridge across San Francisco Bay to contain two cantilever spans, each 1,000 feet long. One span will allow a vertical clearance of 200 feet and the other 175 feet above navigable water.

The bridge will join the city of Richmond and Marin county. It will be 17,769 feet long, nearly three and a half miles, including the approaches, and will contain 19 deck spans besides the long cantilever clearances.

While the length of span of this bridge has been exceeded in other structures, it is unusual to have two such long links in the same bridge.

Engineering
Science News-Letter, February 22, 1930

Making Snow

Real snow is plentiful in many parts of the country at this time of year, but in order to provide meteorologists with it at any time an apparatus for producing synthetic snow has been perfected by Dr. John Mead Adams, associate professor of physics, at the University of California at Los Angeles.

The apparatus used consists of a little glass tube, surrounded by bottles of gurgling water, a thermos jug, long coils of wire and rubber tubing, a cooling apparatus, and a resistance instrument.

As the snow crystals are formed, they drift down upon a black cloth, properly cooled to preserve them for a sufficient time for a microscopic study, and for photographing.

Dr. Adams believes that snow crystals are built up from smaller crystals through the action of kinetic or electrical energy, though as yet he has discovered no definite proof of this during his experiments.

Physics
Science News-Letter, February 22, 1930

Psychiatric Service

A psychiatric service to assist the judge in determining the sentence of all convicted offenders is recommended in a resolution just published by the committee on psychiatric jurisprudence of the American Bar Association.

This committee of lawyers has come to the conclusion that such a psychiatric service should be required by law in every case where the judge has any discretion as to length or type of sentence. It should also be possible for the judge to call for the advice of court psychiatrists in any other case where he thinks it advisable.

"We further recommend," the report states, "that a psychiatric service be available to every penal and correctional institution, that there be a further psychiatric report on every prisoner convicted of a felony prior to his release, and that there be established in each state a complete system of administrative transfer and parole, and that there be no decision for or against any parole or any transfer from one institution to another without a psychiatric report."

The chairman of the committee, Prof. Rollin M. Perkins of the University of Iowa Law School, in commenting on the report to Science Service said:

"It represents a very preliminary step in the effort to make a more scientific approach to problems of social discipline involving mental disease or mental defect. The hope is to do away, as far as possible, with the battle of experts in the courtroom and to permit the mental expert to assist the law in the laboratory or clinic where he can work to best advantage."

Psychiatry—Jurisprudence
Science News-Letter, February 22, 1930

Ice Age Turkeys

Turkey-like birds once nested in the region now occupied by the city of Los Angeles, California. This fact has been brought to light in the course of a review of the Ice Age birds of Rancho La Brea tar pits in the collections of the Los Angeles Museum. The review was undertaken by Dr. Hildegarde Howard of the Museum for the purpose of establishing a census of the birds of the region. It was found that of about 500 individuals of the extinct, turkey-like bird, *Parapavo*, represented in these collections, more than 150 were young birds, many of them only chicks.

Paleontology
Science News-Letter, February 22, 1930

The Regeneration of Earthworms —A Science Classic

Biology

AN ESSAY ON ANIMAL REPRODUCTIONS. By Abbé (Lazzaro) Spallanzani, F.R.S. and Professor of Philosophy in the University of Modena. Translated from the Italian. London: MDCCLXIX (1769).

This little tract having been composed at my request, and sent me from the author, as a present to the Royal Society, I was encouraged to think a translation of it would not prove unacceptable to English Naturalists. Most of the experiments are entirely new, and, for that reason, as well as on account of the singular conclusions that may be deduced from them, deserve to be repeated by different hands, and seen by different eyes. This is what our Italian observer wishes may be done, both in his own country and in this, before he publishes his large work. Facts in appearance so little reducible to the known laws of animal economy, must be duly authenticated in order to be believed; and that evidence, which is sufficient in things more analogous to the general course of nature, can hardly be thought so in the case of discoveries, which seem to be deviations from it. But universal laws are few, and exceptions to them are grown more and more common. In this age, when the talent of observing has been so much improved, and experience has taught us the vanity of opinions and systems, it would be imprudent to reject, without trial, observations, or even hints, which, at the same time that they enlarge our views of nature, tend to increase proportionally our admiration of its GREAT AUTHOR, and may become in time not only instructive, but useful to mankind.

M. MATY.

British Museum,
June 20, 1769.

Three parts may be considered in an earth-worm, transversely divided: the *fore part*, or head; the *hinder part*, or tail, and the *intermediate* part.

Having found that the anterior part, or the head, reproduced the tail, I was willing to try whether this took place, when the head was cut at different distances, and whether any difference in the method of dividing would prevent the usual reproduction.

It was, therefore, necessary to observe, whether the regenerative power existed in the whole length of the worm, so that the head, however long or short, would be equally fit to reproduce a tail. I found that nature has limits, which shall be determined in my work, and beyond which this reproduction of the tail can no longer be affected.

But as heads, differing in their length (within certain limits), still reproduce a tail, the following enquiries could not be omitted. 1. Are those tails equal, that are produced from unequal heads? 2. Do they become so in the same length of time? 3. Does that equality of the tails take place at every point, within the limits assigned for the reproduction? 4. And does it continue during the whole course of this operation?

These experiments, having first been made upon full-grown earth-worms, of one particular species, were repeated on others of the same species, young and still growing; and proper comparisons were made between the reproductions of the first and those of the last.

It was then proper to examine whether the heads in earth-worms of different species, likewise produce new tails. Having found it to be so, I inquired, 1. Whether there is any difference of time between the reproductions of the tails in different species. 2. And being convinced that there was a difference, what might be the reason of it. In the course of these researches, I met with one species of the earth-worm, distinguished from all others, not only by the very long time it requires to begin this reproduction, but likewise by the reproduction itself, which is entirely different from any thing that has been observed, not only on the reproduction of earth-worms, but also on that of other animals. And thus far I proceeded on the reproduction of the tail from the anterior part, or the head.

The next inquiry was, whether the posterior part, or the tail, likewise could produce a new head. I found that, upon cutting off a certain number of rings from the anterior part, the reproduction of the head took place in every species of earth-worms known to me; and I did not fail to attend in great measure to the same things I had noted in the reproduction of the tail.

If the number of rings taken off is such, that the quantity of the anterior part separated be considerable, the reproduction of the head will not take place till after a long time, and then with difficulty; and not in every species of these insects. But as reproduction is only delayed, not prevented, by this kind of section, it may be concluded, that earth-worms, or at least some species of them, not only reproduce the tail, but the head.

To settle this point, I shall examine the little that has been written upon the cutting of the earth-worm by Count Ginnani, Dr. Vandelli, and Valisneri, now professor of natural history at Padua.

When the rings cut off near the head are but few, the part reproduced is always equal to that which was taken off; but when there are many, the new head is commonly shorter, and has fewer rings, than the first.

The preceding facts deserved to be still more illustrated by the following queries. 1. Whether the reproduction of a small portion of head appears sooner than that of the tail? and as this is found to be true; 2. What proportion and what laws nature follows in the lengthening of these two productions? This having been found out, I examined, 3. Whence it comes to pass, that head springs forth sooner than the tail? 4. Why it happens, that, when much of the head is cut off, the reproduction is so much retarded, and so very quick when but little is taken off? 5. What is the reason, that in the first case the new head does not, for the most part, equal the first, either in its length, or the number of its rings? 6. Why in many other species of earth-worms the reproduction of the head does not take place, when the separated part is considerable?

Being, lastly, come to the middle parts, I was desirous to know whether both a new head and a new tail could be reproduced. I found that they really are both renewed, provided a large portion of the head be taken off; for then the same thing will happen that we mentioned before. If a small portion of the anterior part be cut off, both head and tail will spring forth; but as we have already (*Turn to page* 127)

Thyroid Sets the Pace—*Continued*

removed, they do not metamorphose at all.

At one time it was thought the changes occurring in the body of a patient who had hyperthyroidism were due to a poison elaborated by the gland. Other theories credited bacterial infection of some sort with the production of these diseases. But the latest work has shown that the disease is the result, not of an invading germ nor of a subtle poison, but of too much of the substance normally secreted by the gland and needed in normal amounts to maintain the body functions.

This normal secretion of the thyroid gland has found a place among the therapeutic agents of modern physicians. It has also, unfortunately, found its way into the hands of the quack. Some reducing agents, sold to fat people who wanted to lose weight easily, were found to contain either thyroxin or dried thyroid gland. A small amount of this substance will cause loss of weight, but the loss is only a side-issue of the hyperthyroidism brought about by taking it when there is no previous thyroid deficiency. Misguided women and girls who took such "reducing" medicine found themselves very ill with dangerously overactive thyroid glands.

The thyroid gland needs iodine to elaborate its hormone. In fact the active principle of the gland, thyroxin, contains 65 per cent of iodine. This iodine is obtained from food and water. In some parts of the world the water contains very little iodine and the food grown in such regions also lacks this important substance. Then the gland cannot get enough for its needs and either too little hormone is secreted or else the hormone contains too little iodine to function properly. People living in such regions sometimes have large goiter and the other symptoms of underactive thyroid or thyroid insufficiency. Places where iodine is lacking are apt to be mountainous and far from the ocean. Seashore regions are especially rich in iodine, which is abundant in seawater.

In some places where there is a deficiency of iodine it may be given as a medicine, to supplement the amount the gland gets from the water and food, and thus prevent the development of goiter, myxedema and cretinism. For example, the Swiss government puts iodine in all the salt sold in the country. In some cities in other regions of endemic goiter iodine is fed to the school children.

Iodine is also given to persons suffering from the quite different goiter of hyperthyroidism, just before operation for removal of part of the overactive gland. One dose of iodine is all that may be given to these patients. More would be fatal. Just why this one dose is helpful is one of the still unsolved mysteries surrounding the thyroid.

Not only has thyroxin been isolated from the thyroid gland, it has also been prepared artificially by synthesis from coal tar products. This was first done by Dr. E. C. Kendall of the Mayo Foundation in this country, then by Dr. C. R. Harington of England.

Science News-Letter, February 22, 1930

The "Barrel" of Corona

When high voltage surges on electric transmission lines jump an ordinary string of insulators, arcs form from one insulator to the other and destroy them.

But when both ends of the string are protected by metal grading shields, the arc jumps through the air from shield to shield and saves the insulators, F. W. Peek, General Electric engineer, has found in his high voltage laboratory at Pittsfield, Mass.

With the shields a greater voltage is required to produce arcing. This is probably because the additional voltage must supply energy to the "barrel" of corona which forms between the edges of the rings of the shields before the final breakdown, Mr. Peek explains.

The striking appearance of this "barrel" of corona is pictured on the front cover.

Electricity

Science News-Letter, February 22, 1930

California ranks first in the number of farms using electricity, with 65,000 being wired.

The lake front of a Seattle park is being planted with 3,500 Japanese cherry trees.

A survey indicates that more than half the salesclerks in ten cent stores are less than 20 years old.

Factors which make for strength in brick walls have been studied by the U. S. Bureau of Standards.

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Parrot Fever Claims Medical Martyrs

Medicine

Disease Now Thought Transmitted By Canaries

PARROT fever is now adding to the roll of medical martyrs. The history of modern medicine is punctuated with the sacrifices of men and women who, seeking to discover the cause and cure of unknown diseases, have themselves fallen victims.

Today the laboratories in Washington, Baltimore, Pittsburgh, and Chicago are just as much the front line as were the trenches of France during the World War. Illness and perhaps death threatens the workers there.

Dr. William Royal Stokes, bacteriologist of Baltimore who handled some of the first infected parrots, has given his life in the battle with parrot fever, as did Harry B. Anderson, laboratory assistant at the U. S. Hygienic Laboratory. Dr. Daniel S. Hatfield of Baltimore and Dr. Charles Armstrong of the U. S. Public Health Service are both suffering from the disease, although their recovery now seems assured.

Other diseases which have had their deadly revenge on the warrior-scientists who fought them are yellow fever, Marta fever, bubonic plague, and Rocky Mountain spotted fever. The list of these gallant fighters includes Jesse W. Lazear, Hideyo Noguchi, Adrian Stokes and William A. Young, who perished in the fight against yellow fever; Thomas B. McClintic and A. Leroy Kerlee, who succumbed to Rocky Mountain spotted fever; Alexandre Yersin and Hermann Franz Muller, who were victims of the dread bubonic plague; Tito Carbone and Allen Macfadyen, who died of Malta fever; J. Everett Dutton, who died of African relapsing fever; Howard Taylor Ricketts, who died of tabardillo or Mexican fever; and Daniel A. Carrion, who died of verrugas.

Dr. George W. McCoy, director of the U. S. Hygienic Laboratory, is himself carrying on the U. S. Public Health Service's fight against the disease which Dr. Armstrong was investigating when he fell a prey to it.

Dr. McCoy is a veteran of many engagements in the fight against disease. He did some of the pioneer work in the study of tularemia, has conducted important investigations on plague, leprosy and influenza and has also done work in the development of some of our protective and curative vaccines and sera.

Convalescent serum, of which Dr. Armstrong has had several doses, is thought to have contributed to the improvement in his condition. This serum was obtained by some of Dr. Armstrong's fellow-officers of the U. S. Public Health Service who visited convalescent patients in Baltimore and obtained from them enough blood to yield the serum for Dr. Armstrong.

"I know of no case of psittacosis in canaries," declared Dr. Herbert Fox of the Pepper Laboratory of Clinical Medicine, Philadelphia, when questioned regarding the possibility of these popular birds having the disease which their feathered relatives, the parrots, have been suffering from and transmitting to human beings during the past few weeks.

Two cases of parrot fever or psittacosis, in which the disease was contracted from a canary, have occurred in Norfolk, Va., according to the U. S. Public Health Service. An officer of the service was sent from Washington to Virginia and reported on his return that the history of the two cases showed that the patients had contracted the disease from a sick canary.

"The identity of the disease psittacosis has not been established," Dr. Fox continued. "I have no doubt the capable workers of the government service will solve the problem. I regret deeply the loss of Dr. Stokes of Baltimore, whose death from the disease has just been reported.

"The association of parrot fever with human pneumonia outbreaks has not been perfectly established. I understand no culture of the organism has been proven in the present outbreak in this country. I have seen no confirmation of the newspaper report of the Chicago discovery. The psittacosis bacillus is not very difficult to isolate from parrots in fully developed cases of the disease. In parrots the germ seems the cause of the disease. There are groups of deaths among parrots, canaries, finches and thrushes in which the bacterial findings are not conclusive.

"I have thought of a non-microbic virus as the possible cause of the disease. If this is true of the present outbreak, the spread of the parrot infection to other birds is more than probable.

"I presume the tissues of the humans who have died have been tested with parrots and other birds. The confusing issue is the pulmonary involvement in birds and man. The virus seems easily transmissible, possibly by dust, whereas the germs of the *Bacillus psittacosis* group are usually transmitted by food and water, also by handling of birds or soiled objects.

"The indications for parrot owners are to isolate each bird, to permit no dust from the cages, to handle the birds and their utensils with gloves, to burn the refuse and to have the birds inspected. Sick birds should not be killed and destroyed but should be shown to the authorities."

This last bit of advice was also emphasized by Dr. T. S. Palmer of the U. S. Biological Survey in Washington. Identification of the suspected birds is important as a means of tracing from what country the birds have come, Dr. Palmer said. Dr. Palmer regretted that no reliable information as to the species of the infected birds has yet been obtained. He pointed out that we import 175 different kinds of parrots into this country.

Science News-Letter, February 22, 1930

Physicians Meet—*Cont'd*

kidney, bladder, uterus, or blood vessels."

Definite disease of the digestive tract, such as inflammation of the gall-bladder, ulceration or cancerous changes in the intestines and stomach, or appendicitis was found in 175 cases or one-third the total number.

"In 43 cases the indigestion was thought to be due primarily to nervousness and in 50 more it appeared to be due to the congenitally frail, sensitive, or psychopathic make-up of the patient," Dr. Alvarez said. "In a number of cases it was due to the fact that husband and wife were at swords' points and the meals were being eaten to the accompaniment of bitter words. Often the patient was so nervous, so querulous, or so badly upset by fatigue and worry that it was hard to know what significance to attach to the symptoms, and the operation which would have been prescribed for a strong phlegmatic person with the same complaints was hardly thought of."

Science News-Letter, February 22, 1930

Somewhere in the English Language

SOMEWHERE—how remote and inaccessible that sounds. Somewhere in that forest maze of our language—seemingly inextricably intermingled—are words which bring treasures of money, power, position, to the skillful user. Words that trill with laughter, thunder commands, tender words fragile as a wood plant, terms of lofty inspiration, compelling words to add strength to your arguments, words for every shade of meaning.

All round you they are, "close by, disregarded, quite at hand," as Conrad once exclaimed—yet by force of circumstance, you travel the one small path that years of usage have worn through this labyrinth.

How often you have sought to leave this path—to find a new word for that trite expression, to clothe your thought in terms that clearly express your meaning—to avoid constant needless repetition. Your dictionary cannot help you here—you must first know the words you are seeking.

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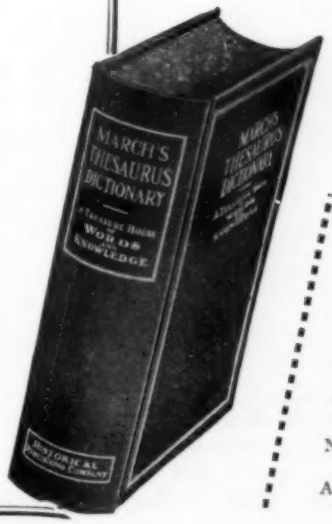

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Stone Age Tribe Like Modern Americans

Ethnology

American Ethnologist Describes Philippine People

HUMAN nature has not changed much since the Stone Age, Dr. Margaret Mead, ethnologist at the American Museum of Natural History, found when she studied a tribe in the Admiralty Islands, near the Philippines, from which she has just returned.

Dr. Mead, who lived with the Manus tribe in its village built on stilts above the water, found that these people today live in the manner of the Stone Age, which flourished in Europe 20,000 to 30,000 years ago. Their chief concession to modern progress is the use of steel knives and adzes, obtained from white men.

"But in mind and spirit," Dr. Mead declared, "the Manus people are exceedingly like us Americans. They are thoroughly commercially-minded. They have only a rudimentary sense of humor, they are just as Puritanical as we were before the war and they have a lot to learn yet about getting a good time out of life.

"With them 'life is real, life is earnest'—lots of dogs' teeth to be won or lost, dogs' teeth being their most valuable form of money. Unfortunately canny European traders have caused a glut in the dogs' tooth market, seriously depreciating this currency. Old men sit around and wag their heads telling each other that the world is going to the 'demnition bow-wows' since it takes ten dogs' teeth today to buy what one would when they were boys.

"These people are exceedingly democratic, also. In fact, they settle all of their problems of state by quarreling it out, much as we do, except that they have no form of Government—not even a head to their tribe. Public questions are ragged over until public opinion is fairly well settled before concerted action is taken, as a rule.

"They are efficient, honest, hard-working and unimaginative except that they take advantage of the main chance—almost like good New Yorkers. Certainly no one can obtain power or public respect without accumulating wealth. Some of the greatest plutocrats in New Guinea are found in this tribe, their wealth, in addition to dogs' teeth, consisting of carved wood, shell money, pigs, oil and sago.

"Their Puritanism, just as ours formerly did, depends chiefly upon establishment of property rights. A mating represents a considerable investment on the part of many people, and therefore must not be interfered with. Child betrothal is the custom. The relatives of the boy at betrothal make extensive gifts of dogs' teeth, shell money and beads to the relatives of the girl. The relatives of the girl respond in pigs, oil and sago.

"This trading relationship somewhat resembles the American custom of Christmas giving and is kept up by the relatives throughout the lives of both the boy and girl. It is practised upon every possible excuse. When the boy has his hair cut at about the age of five, for example, there are exchanges of gifts.

"This becomes complicated as families grow and children are betrothed. The productive economic effort, however, is very largely the occupation of fishing. Fish are traded to one mainland tribe for carved wood, the wood is traded to another group for pigs, and the pigs are traded to still another tribe for dogs' teeth. The Manus folk are apt to make a profit on each transaction.

"I have subjected my friends and neighbors to no formal tests, but observed them closely and noted my observations. This did not bother them in the least. In fact, one group describes a white man as 'one who looks in a book all the time.'

"The Manus Islander is not like many of his Polynesian cousins—he doesn't make an art of living in any way. He has no manners, and no art of any importance, although like us he buys and sells the art of others. He lacks the charm and grace of many other South Sea tribes. Nor has he the emphasis upon sorcery found in Papua. He is just an ordinary, primitive capitalist."

Science News-Letter, February 22, 1930

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Nature Ramblings

By Frank Thone

The Lynx

Of all the members of the cat family in America, the lynx is about the wickedest. Though nowhere near the size of a mountain lion or puma he is far more formidable, for the larger beast is a sneak and a coward and flees from any trace of man. The lynx, however, is as truculent as a leopard, and a great deal more likely to go out hunting for trouble. Compactly built, with a strong neck and blocky shoulders, he is a formidable fighter even when pitted against a pack of dogs or a man with a long knife or heavy club, and he sometimes mauls his hunters if he is brought to bay or steps into a trap.

The gleaming yellow eyes of the lynx, shining balefully out of his den, have given the big cat a reputation for seeing better than he does. Many people believe that in addition to seeing in the dark—which of course no cat or any other animal can do—the lynx can see straight through wood, metal or any other substance! A penetrating glance indeed.

The common wild cats of the East are all members of the lynx family, but the true lynx of the northern woods is the Canada lynx, the "loup cervier" of the French-Canuck habitant, about which all sorts of superstitious legends have been woven. It seems to be practically identical with the European lynx, with no more difference than one would expect from changes due to separation in time and geography.

Science News-Letter, February 22, 1930

Knotted cords were used for keeping government records in ancient China as well as in prehistoric Peru.

Whooping cranes are almost extinct; so there was excitement when an ornithologist saw two recently in the Louisiana marshes.

Regeneration of Earthworms—*Continued*

observed, the head appears first, and then the tail, according to the law which nature was found to adhere to.

The difficulty, therefore, with regard to the intermediate parts, lies in the reproduction of the head; and although this often fails, the tail will still begin to be regenerated; but this dies sooner or later, together with the middle part.

But how comes it to pass, when equal portions are cut off from the two extremities, viz. the head and tail, of an earth-worm, that, although both extremities perish, yet if they are kept in a proper situation, the point of the tail survives that of the head?

These reproductions take place in the earth-worm, when it is cut across with a pair of scissors; but what happens, 1. If instead of being cut, the insect be torn asunder; 2. or if fire be applied to the divided part?

Hitherto the animal is supposed to have been cut in three parts, viz. the head, the tail, and the middle piece.

I was then induced to enquire what happened to the earth-worm, when cut in four, five, six, or more parts, which I ascertained by a great variety of experiments.

I should not have done justice to the system of animal reproductions, had I omitted to consider three different states in the earth-worm; one preceding the section; another attending the operation; and a third which succeeds it.

As to the first, we know that an earth-worm being placed upon loose and moist ground, hides itself by boring it with its head. It avoids every obstacle in its way; it generally advances forwards, or with its head foremost; it glides without any difficulty along the sides of vases, etc.

Now do the same phenomena appear in a head just deprived of its tail? in the intermediate part? or in the tail alone?

Science News-Letter, February 22, 1930

In the city of Cologne, Germany, pedestrians who violate traffic regulations get tickets and fines, just as offending motorists do.

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FIRST GLANCES AT NEW BOOKS

A HISTORY OF SCIENCE AND ITS RELATIONS WITH PHILOSOPHY AND RELIGION—William Cecil Dampier Dampier-Whetham—*Macmillan* ($6). Man has tried to interpret the world in three ways—through religion as a manifestation of the creator to his creatures, through philosophy as the result of understandable causes, and through science by experiment with brute facts. The combinations and oppositions of these methods during man's mental history from Babylonian astronomy to present-day physics are traced in this readable and scholarly book. It is one of the best popular histories of science. It is a better history of philosophy than some that have appeared lately.

General Science—Philosophy
Science News-Letter, February 22, 1930

ECONOMIC GEOGRAPHY—R. H. Whitbeck and V. C. Finch—*McGraw-Hill* ($3.50) The second edition of a widely used textbook which shows how people have adjusted themselves to their geographical environment.

Geography—Economics
Science News-Letter, February 22, 1930

HEALTH AND CONTROL—Jesse Feiring Williams and Theresa Dansdill—*Sanborn* (68c). The third volume of the Wholesome Living series. An attractive book for teaching children how to live healthily.

Hygiene
Science News-Letter, February 22, 1930

HEALTH AND SERVICE—Jesse Feiring Williams and Theresa Dansdill—*Sanborn* (72c). The fourth book of the Wholesome Living series. The emphasis is more physiological and the book would be suited to older children than those who might be reached with the third volume of the series on "Health and Control."

Hygiene
Science News-Letter, February 22, 1930

BACKGROUNDS OF BIOLOGY—John Giesen and Thomas L. Malumphy—*Bruce* ($2.50). This book contains a good deal more discussion of the philosophical implications of various biological doctrines than is to be found in most general texts. Especial attention is given to the subject of evolution, on which the stand of the authors is somewhat conservative, going beyond the skepticism of O'Toole perhaps, but not venturing so far as Wasmann, and certainly not so far as Dorlodot.

Biology
Science News-Letter, February 22, 1930

PSYCHOLOGY AND INDUSTRIAL EFFICIENCY—Harold E. Burtt—*Appleton*—($3). Prof. Burtt's book is the outgrowth of his university course on this subject of enabling the employee to work as efficiently as he is able. The book is planned with the idea that it will be serviceable, not only as a school text, but also as an aid to business men who wish to understand the significance of training methods, policies, arrangement of materials, fatigue, and other factors that affect the worker and his work.

Psychology
Science News-Letter, February 22, 1930

THE PREVENTION OF HUMAN TUBERCULOSIS OF BOVINE ORIGIN—William G. Savage—*Macmillan* ($4.25). A comprehensive account of the present situation. Dr. Savage thinks that much of the funds and work now devoted to the treatment of sufferers from this form of tuberculosis could be profitably devoted to prevention. His book contains material that will be valuable to workers in the field of tuberculosis prevention whether their approach is from the side of public health or of the dairy industry.

Medicine
Science News-Letter, February 22, 1930

DRUG MAP OF THE WORLD—*National Wholesale Druggists' Association.* Intended for window display during national pharmacy week, this large map of the world showing the places from which come the various drugs we use, would be of considerable value and interest in the class room.

Geography—Pharmacy
Science News-Letter, February 22, 1930

BIBLIOGRAPHY ON THE RELATION OF CLOTHING TO HEALTH—Ruth O'Brien, Esther C. Peterson, and Ruby K. Worner—*U. S. Government Printing Office* (25c). This publication of the U. S. Department of Agriculture covers the years between 1875 and 1927, with a few references to earlier and later publications. The physiological and psychological aspects of clothing; effects of clothing fabrics, including poisoning from dyes, permeability, moisture absorption, etc.; and clothing as a carrier of disease, are some of the topics to which references are included in this comprehensive bibliography.

Home Economics—Hygiene
Science News-Letter, February 22, 1930

ULTRAVIOLET LIGHT AND VITAMIN D IN NUTRITION—Katharine Blunt and Ruth Cowan—*University of Chicago Press* ($2.50). A comprehensive survey of the present knowledge on a subject that is particularly interesting to those who have to do with the rearing of young children. In a foreword Dr. Morris Fishbein, Editor of the Journal of the American Medical Association, says: "In this book Dr. Blunt and Miss Cowan have assayed the literature, have collected it under significant headings, skimmed the truth from the fantastic notions and the exaggerations of those commercially minded, and yielded what seems to me to be a fundamental work for all interested in this field."

Nutrition
Science News-Letter, February 22, 1930

ORGANIC CHEMISTRY—A. H. Clark—*Van Nostrand* ($3.50). In this textbook for students of pharmacy and medicine the emphasis is away from industrial chemistry. Subjects such as dyes and type reactions for the synthesis of various organic compounds are given very brief treatment, while the alkaloids and related substances, dyes as medicaments, arsenicals, and mercurials, are discussed more fully than is usual in a text of this size on organic chemistry.

Chemistry
Science News-Letter, February 22, 1930

BASKETRY OF THE SAN CARLOS APACHE—Helen H. Roberts—*American Museum of Natural History* ($1). A detailed exposition of the weaving materials used by these Indians, also their methods of weaving, shaping and ornamenting baskets. One of the Anthropological Papers of the American Museum of Natural History..

Anthropology
Science News-Letter, February 22, 1930

THE ECOLOGY AND ECONOMICS OF ONEIDA LAKE FISH—C. C. Adams and T. L. Hankinson — *Roosevelt Wild Life Forest Experiment Station* ($1.25). Oneida Lake was one of the first of the inland lakes of this country to be called on for regular crops of food fishes. It has continued to yield its crop every year for well over a century, but increasing demands begin to call somewhat imperatively for more systematic management. The present study offers a foundation to build on.

Ecology
Science News-Letter, February 22, 1930

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